Epidermal Skin Cancers: Anatomical and Pathological Distribution

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ABSTRACT:

BACKGROUND :

There are three major types of skin cancer; basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and malignant melanoma.The distribution of these tumors on the face follows particular anatomical regions which may be related to histological subtypes of the tumor.

OBJECTIVE:

To describe and compare the clinicopathological characteristics of epidermal skin cancers regarding facial distribution of these tumors and their histological correlations.

METHODS:

Data sources for this retrospective case-series study included all pathological reports of patients with epidermal skin cancers diagnosed at histopathology laboratory of Al-Jamhuri Teaching Hospital in Mosul city between the years 2008 and 2010.

RESULTS:

There were 117 patients with different facial epidermal skin cancers. BCC represented the highest frequency (68.3%) among all facial epidermal skin cancers (and the most frequent eyelid malignancy), followed by SCC (28.5%) while malignant melanoma was the least frequent skin cancer (3.2%). There was no difference in the frequency of distribution of both BCC and SCC between nose and cheek (p=1, p=1, respectively) but the nose was the most frequent region of involvement of the nodular variant of BCC. Preexisting mole, xeroderma pigmentosa, actinic keratoses and scar of previous burns were found to be associated with different epidermal skin cancer.

CONCLUSION:

BCC was the most frequent epidermal skin cancer of the face followed by SCC. Histological variant of BCCs followed variable facial distribution , while no difference in facial involvement was found regarding BCCs and SCCs.

KEY WORDS: basal cell carcinoma, squamous cell carcinoma, skin cancer.

INTRODUCTION:

There are three major types of skin cancer, basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and malignant melanoma (MM)[1].

It is known that, the development of skin cancers is influenced by sunlight exposure and certain host factors such as burns, positive family history of skin cancer, skin type I (always burns, never tans) and genetic predisposition which include albinism and xeroderma pigmentosa [1,2,3]. However, few studies have directly compared the clinicopathological correlation for melanoma and non-melanoma skin cancers[1].

The importance of mole as an indicator for BCC risk has only been investigated in few studies[3].

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Moreover, varieties of common skin lesions have been implicated as risk factors for the development of nonmelanoma skin cancers such as melanocytic nevi, actinic (solar) keratoses and Bowen's disease[4-6] which represent a multistep accumulation of genetic damage[6]. In general about 72% of SCC have been noted to develop within actinically damaged skin[6].

Previous observations have also correlated the appearance of skin cancers types on certain anatomical sites such as the frequent distribution of BCC on certain facial regions as the orbit[7], the association of the superficial subtype of BCC with trunkal areas[2,6,7] and the development of invasive SCC at the site of previously injured skin[8].

Facial BCC exhibits a wider subclinical spread than at other sites hence, the anatomical location of the tumor may predict its risk group; high risk

are those lesions developed at the nose, ear, eyelid and temple[9]. About 90-95% of all malignant eyelid tumors are BCCs and if left untreated, disease can spread to the globe which will require exentration[9].

This study aims at describing and comparing the clinicopathological characteristics of epidermal skin cancers namely BCC, SCC and malignant melanoma with an emphasis on facial distribution of these tumors in certain facial regions and their histological correlation.

MATERIALS AND METHODS:

This retrospective study design included all facial epidermal skin cancers (namely: BCC, SCC and malignant melanoma) that were diagnosed at histopathology laboratory of Al-Jamhuri Teaching Hospital in Mosul City between the years 2008 and 2010. An official permission to undertake this study was granted by Nineveh Health Office.

All pathological reports of patients with the previously mentioned facial epidermal skin cancers were reviewed. Data regarding age, gender, the exact anatomical site of specific tumor on the face, clinical notes regarding the presenting, past and family histories and microscopic features regarding the pathological subtype and grading of a particular primary or recurrent tumor were all recorded. Epidermal skin cancers developing at other body sites were excluded.

Basic statistical methods were used to calculate means, standard deviation and percentages. Minitab 11 and SPSS 11.5 statistical programs were used for figures designation and processing.

RESULTS:

The total number of patients was 117. Of these, 79 patients presented with a diagnosis of BCC, 34 patients had a diagnosis of SCC and only 4 patients presented with malignant melanoma. Females were predominant than males representing 68 (58%) and 49 (42%), respectively (Table 1). The mean ages of patients with BCCs and SCCs were 58 and 52 years, respectively, while that for malignant melanoma was 43 years (Table 1).

A total of 123 epidermal skin cancers of the face were studied in 117 patients, as some patients had more than one type of cancer and more than one facial lesion. A total of 84 BCCs were studied in 79 patients and represented the highest frequency (68.3%), followed by 35 SCCs in 34 patients representing the next frequent type (28.5%), while there were only 4 cases of malignant melanoma representing 3.2% of all sample

Risk factors that were found to be associated with both BCC and SCC were xeroderma pigmentosa and solar keratoses while one case of SCC was complicating the scar of previously burned skin and nine cases of BCC (10.7%) arise from a pre-existing mole (Table 2 and 3).

The predominant clinical presentation in both BCC and SCC was ulcerative lesion (47.6% and 62.9 %, respectively), while all four cases of malignant melanoma were found to be nodular on initial presentation (Table 3). The majority of epidermal skin cancers were primary lesions at time of diagnosis and only two cases of BCC and three cases of SCC were locally recurrent lesions (Table 4).

Regarding the facial distribution of epidermal skin cancers, the majority of BCCs and SCCs were distributed equally on the nose and cheek regions (p=1, p=1, respectively) (Figure 1). The most frequent eyelid malignancy was BCC followed by SCC (Figure 1).

The predominant histological variant of BCC was the nodular variant (79.8%) (Table 5) and distributed predominantly at the nasal region (p=0.349) (Figure 2). Basosquamous and morpheaform variants were less frequent (11.9% and 2.4%, respectively) (Table 5) and were distributed mainly over the cheek region (Figure 2) (p value for basosquamous BCC= 0.019 and p value for morpheaform BCC=1) , while the adenoid variant was distributed equally over most regions of the face (p=1) (Figure 2).

About 57.1% of all SCC were well differentiated and only 8.6 % were poorly differentiated (Table 5). The commonest site for the moderately differentiated SCC was the nose, while well differentiated SCC was predominantly distributed over the cheek, lower lip, upper eyelids and auricle (Figure 3).

Table 1: Age and sex distribution of patients with different facial epidermal skin cancers.

Total number of lesions	84(100%)	35 (100%)	4 (100%)
Clinical Characteristics	BCC	SCC	Malignant Melanoma
-Nodule	35(41.7%)	13 (37.1%)	4(100%)
-Ulcer	40(47.6%)	22 (62.9%)	0(0)
-Pre-existing mole	9(10.7%)	0(0)	0(0)

Table 2: Etiologic risk factors of patients with different facial epidermal skin cancers.

Patients Characteristics	BCC	SCC	Malignant Melanoma
Age (Mean ± SD)	58±14.7	52±21	43.6±18
Sex			
-Male	36 (45.6%)	11(32.4%)	2(50%)
-Male	36 (45.6%)	11(32.4%)	2(50%)
Total number of patients	79 (100%)	34 (100%)	4(100%)

Table 3: Clinical characteristics of different facial epidermal skin cancers.

Histological Characteristics		
SCC (35)		
	-Well differentiated	20 (57.1%)
	-Moderately differentiated	12 (34.3%)
	-Poorly differentiated	3 (8.6%)
BCC (84)		
	-Nodular (Conventional)	67 (79.8%)
	-Basosquamous	10 (11.9%)
	-Adenoid	5 (5.9%)
	-Morpheaform	2(2.4%)

Table 4: Clinical presentation of different facial epidermal skin cancers.

Presentation	BCC	SCC	Malignant Melanoma
-Primary	82(97.6%)	32(91.4%)	3(75%)
-Locally Recurrent	2(2.4%)	3(8.6%)	0(0)
- Lymph Node Metastases	0(0)	0(0)	1(25%)
Total number of lesions	84(100%)	35 (100%)	4 (100%)

Table 5: Pathological characteristics of different facial epidermal skin cancers.

Etiologic Risk Factors	BCC	SCC	Malignant Melanoma
- Burns	0(0)	1(2.9%)	0(0)
-Xeroderma Pigmentosa	2(2.5%)	4(11.8%)	0(0)
-Albinism	0(0)	0(0)	0(0)
-Solar keratoses	1(1.3%)	1(2.9%)	0(0)
-No risk factor	76 (96.2%)	28 (82.4%)	4 (100%)
Total number of patients	79(100%)	34(100%)	4(100%)

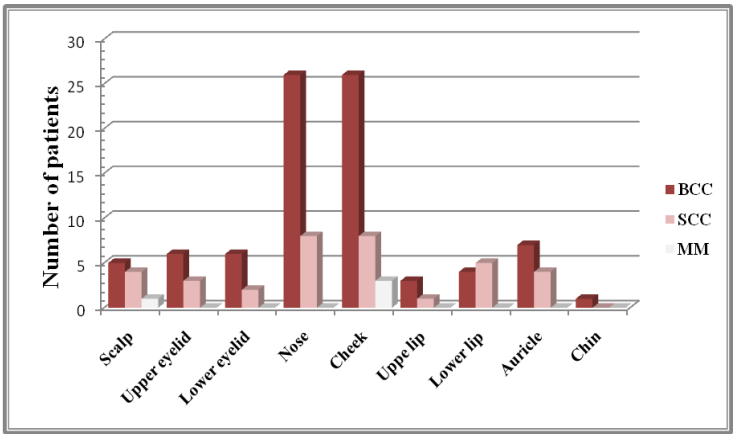

Figure 1: Facial distribution of epidermal skin cancers.

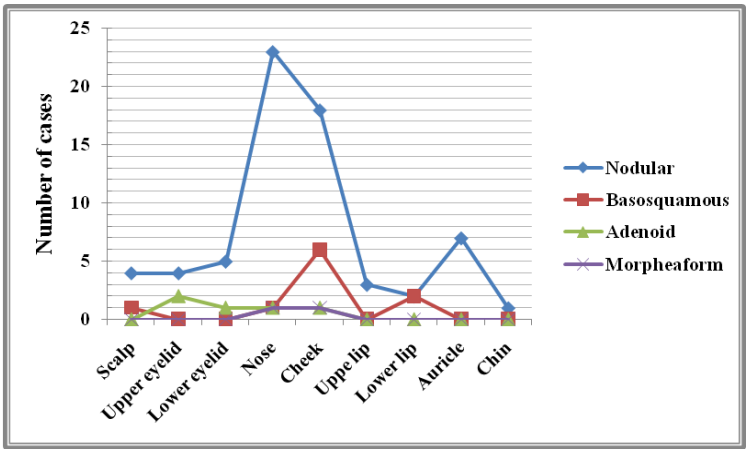

Figure 2: Facial distribution of different histological subtypes of basal cell carcinoma.

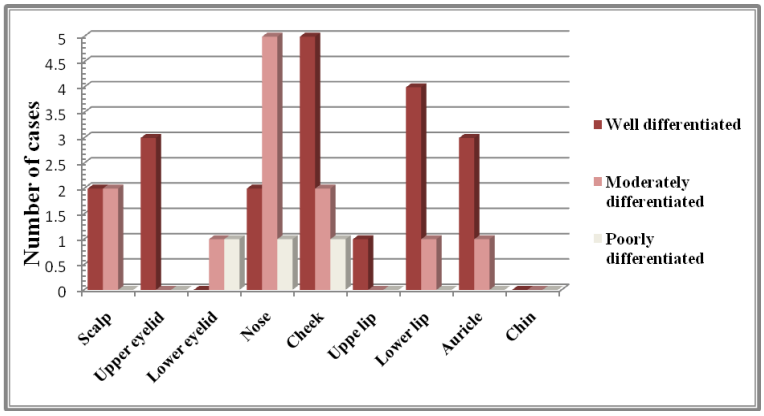

Figure 3: Facial distribution of different grades of squamous cell carcinoma.

DISCUSSION:

This study is a retrospective case-series study that enrolled all histologically diagnosed facial epidermal skin cancers at Al-Jamhuri Teaching Hospital for three consecutive years. BCC was the most frequent skin cancer followed by SCC. An observation found in previous studies in various centers[6,10,11]. Although ultraviolet exposure remains the main causative factor in the pathogenesis of BCC[2,4,6], it's site of occurrence in this study did not correlate with area of maximum exposure, with equivocal distribution over various parts of the face suggesting the role of other pathogenic factors in the causation of BCC[10]; in this study, the histological variant of BCC was found to be correlated with specific sites. Nose was the commonest site for the nodular variant, while the more aggressive basosquamous variant was mainly distributed over the cheek. The morpheaform variant was also distributed in the cheek region. Similar observation was found in previous work[7].

In one large retrospective series of 1039 consecutive BCCs, the commonest variant was nodular (21%), while only 1.1% were morpheaform[4]. Comparable results were found in this study although with higher frequency for the nodular variant (79.8%). This difference in the frequency of occurrence is mainly related to the smaller sample of BCC in this study.

In this work, the morpheaform BCC represented the least frequent type of BCCs (2.4%). According to literature review, morpheaform BCCs represent roughly 1-5% of all BCCs[4].

Squamous cell carcinoma is the next most frequent epidermal skin cancer, it is less frequent than BCC (ratio of 1:2). Lower ratio was found in previous observation (ratio of 1:4)[10]. Similar to BCC, there was a comparable distribution for SCC over the cheek and nose. The majority of SCC felled within the well and moderately differentiated grades, similar results were found in a previous clinicopathological study enclosing 26 histologically confirmed SCC (well and moderately differentiated SCC represented 46% and 42.3%, respectively)[12].

Literature review has correlated high risk nonmelanoma skin cancers to certain anatomical sites over the face like central face for BCC and lip and ear for SCC[6]. In this work, the most frequent eyelid malignancy was BCC, but SCC was also frequent. It has been reported that 90-95% of all malignant eyelid tumors are BCCs[9,13].

In this study, some of patients with nonmelanoma skin cancers have had predisposing factors for the development of particular skin cancer, of these, a changing of pre-existing mole represented the highest frequency, followed by personal history of xeroderma pigmentosa and solar keratoses. Although melanocytic nevi are well defined risk factor of melanoma[14], they are so common as to make there co-existence with BCC in any given patient a random event in all probability[4].

Actinic keratoses is a common premalignant lesion on sun damaged areas and is a precursor of SCC[5,10,14]. It is believed by some that actinic keratoses and SCC are two names for the same process but the rate of progression from actinic keratoses to SCC is difficult to assess as it is impossible to ascertain an incidence rate for actinic keratoses since most of these lesions do not come to medical attention[5].

In this study, xeroderma pigmentosa was mainly associated with SCC and two cases of BCC of the aggressive basosquamous variant, the frequency of reporting of different nonmelanoma skin cancers in patient with xeroderma pigmentosa is variable among reported cases[15], nevertheless, this inherited disorder is the prototype genodermatosis associated with both BCC and SCC[4,6,15].

Malignant melanoma, in this study was found to be the least frequent epidermal skin cancer with only four cases were reported, therefore, it was not possible to analyze different clinocopathological parameters.

CONCLUSION:

Basal cell carcinoma represents the highest frequency among all epidermal skin cancers of the face and the most frequent eyelid malignancy followed by SCC. The majority of BCCs and SCCs arises denovo with only few cases are associated with identifiable risk factor.

Histological variants of BCCs follow variable facial distribution, with the nasal region representing the most frequent site of involvement for the nodular variant. Further follow up studies are required to assess the high risk groups for recurrence and subsequent metastasis for epidermal skin cancers.

REFERENCES:

1- Han J, Colditz GA, Hunter DJ. Risk factors for skin cancers: a nested case-control study within the Nurses' Health Study. **.** *Int J Epidemiol* 2006;35:1514-21.

2- Wong CSM, Strange RC, Lear JT. Basal cell carcinoma. *BMJ* 2003;327:794-98.

3- Van Dam RM, Huang Z, Rimm EB, et al. Risk factors for basal cell carcinoma of the skin in men: results from the health professionals follow-up study. *Am J Epidemiol* 1999;150:459-68.

4- Crowson AN. Basal cell carcinoma: biology, morphology and clinical implications. *Mod Pathol* 2006;19:S127-47.

5- Smoller BR. Squamous cell carcinoma: from precursor lesions to high-risk variants. *Mod Pathol* 2006;19:S88-92.

6- Samarasinghe V, Madan V. Nonmelanoma skin cancer. *J Cutan Aesthet Surg* 2012;5:3-10.

7- Heckmann M, Zogelmeier F, Konz B. Frequency of facial basal cell carcinoma does not correlate with site- specific UV exposure. *Arch Dermatol* 2002;138:1494-97.

8- Mullen JT, Feng L, Xing Y, et al. Invasive squamous cell carcinoma of the skin: defining a high- risk group. *Ann Surg Oncol* 2006;13:902-9.

9- Baxter JM, Patel AN, Varma S. Facial basal cell carcinoma. *BMJ* 2012;345:37-37-42.

10- Syrigos KN, Tzannou I, Katirtzoglou N, et al. Skin cancer in elderly. *In vivo* 2005;19:643-52.

11- Delfino S, Innocenzi D, Lorenzo GD, et al. An increase in basal cell carcinoma among the young: an epidemiological study in a Middle- South Italian population. *Anticancer Res* 2006;26:4979-84.

12- Adinarayan M, Krishnamurthy SP. Clinicopathological evaluation of nonmelanoma skin cancer. *Indian J Dermatol* 2011;56:670-72.

13- Jahagirdar SS, Thakre TP, Kale SM, et al. A clinicopathological study of eyelid malignancies from central India. *Indian J Ophthalmol* 2007;55:109-12.

14- Wills M. Skin cancer screening. *Phys Ther.* 2002;82:1232-37.

15- Pathy S, Naik KK, Bhasker S, et al. Squamous cell carcinoma of face with xeroderma pigmentosa- a case report. *Indian J. Med. Paediatr. Oncol.* 2005;26:47-49.